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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,698	09/09/2003	Young-Kwon Cho	45701	8754

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EXAMINER	
CHU, MICHAEL	

ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/657,698	CHO ET AL.	
	Examiner	Art Unit	
	Michael Chu	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-13 and 15-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *5,14 and 25* is/are allowed.

6)☒ Claim(s) *1-4, 6-13, 15-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-4, 6-13 and 15-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (US Publication# 2005/0020219) in view of DiBuduo (US Patent# 6,999,778).

Consider Claims 1 and 10. Sih et al. teaches an apparatus for acquiring a phase of a pseudo-random noise (PN) sequence acquired from a signal received from a base station in a mobile communication system (0007, lines 5-9, 0058, 0035-0037, 0065, 0061), in an in-phase PN sequence using pilot signals to provide phase references. Sih et al. teaches the apparatus comprising:

-a second energy measurer for measuring an energy of an on-time path from the acquired PN sequence (0048, lines 1-6, 0133-0134, 0052, 0057, See Parts 208A-N of Figure 2, See Part 208 of Figure 3, 0127, lines 4-5, 0128, lines 1-3, 0129, lines 4-6, 0130, lines 1-3, 0132, lines 3-7);

-a first normalizer for normalizing an energy of the first energy measurer with an energy measured by the second energy measurer (0133-0135, See Parts 1302, 1322 of Figure 13); and

-a third energy measurer for tracking a phase of the PN sequence using the normalized energy from the first normalizer (0052, lines 1-9, particularly lines 2-4, 0048, 0133-0134, 0053), where each demodulation finger 208 tracks a distinct signal pairing.

Although Sih et al. teaches the apparatus, Sih et al. does not specifically teach the apparatus comprising: a first energy measurer for measuring each energy of an early path and a late path from the acquired PN sequence. However, in related art, DiBuduo teaches pilot energy measurements associated with PN phase offsets, whether it corresponds to an early arriving signal or delayed path; (Col. 10, lines 49-67, Col. 11, lines 1-10, Col. 12, lines 54-60, Col. 13, lines 29-43, Col. 6, lines 48-67 & Col. 7, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Sih et al. and DiBuduo in order to enhance the accuracy of a phase measurement process with pilot signals.

Consider Claim 19. An apparatus for acquiring a phase of a pseudo-random noise (PN) sequence acquired from a signal received from a base station in a mobile communication system system (0007, lines 5-9, 0058, 0035-0037, 0065, 0061), in an in-phase PN sequence using pilot signals to provide phase references. Sih et al. teaches the apparatus comprising:

-a switch for selecting a local PN sequence generator (0057-0058, See Parts 302, 208 of Figure 3), in a PN sequence generator 302 within a demodulation finger 208;

-a second energy measurer for measuring an energy value of an on-time path from the acquired PN sequence (0048, lines 1-6, 0133-0134, 0052, 0057, See Parts 208A-N of Figure 2, See Part 208 of Figure 3, 0127, lines 4-5, 0128, lines 1-3, 0129, lines 4-6, 0130, lines 1-3, 0132, lines 3-7);

-the local PN sequence generator for resetting an on-time path's phase using an energy difference of the selected path, generating a PN sequence having the on-time path's phase, and providing the generated PN sequence to the first energy measurer (0057-0058, See Parts 302, 208 of Figure 3, 0132, line 5, 0134);

-a first normalizer for normalizing an energy measured by the first energy measurer with an energy measured by the second energy measurer (0133-0135, See Parts 1302, 1322 of Figure 13); and

-a third energy measurer for tracking a phase of the PN sequence using the normalized energy from the first normalizer (0052, lines 1-9, particularly lines 2-4, 0048, 0133-0134), where each demodulation finger 208 tracks a distinct signal pairing.

Although Sih et al. teaches the apparatus, Sih et al. does not specifically teach the apparatus comprising:

-energy values of an early path and a late path that can be measured for the phase of the acquired PN sequence; and

-a first energy measurer for calculating an energy value of a path selected by the switch.

However, in related art, DiBuduo teaches pilot energy measurements associated with PN phase offsets, whether it corresponds to an early arriving signal or delayed path; (Col. 10, lines 49-67, Col. 11, lines 1-10, Col. 12, lines 54-60, Col. 13, lines 29-43, Col. 6, lines 48-67 & Col. 7, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Sih et al. and DiBuduo in order to enhance the accuracy of a phase measurement process with pilot signals.

Consider Claims 2, 11 and 20, in regards to claims 1, 10 and 19, respectively, above. Although Sih et al., as modified by DiBuduo, teaches the apparatus for acquiring a phase of a pseudo-random noise (PN) sequence acquired from a signal received from a base station in a mobile communication system (0007, lines 5-9, 0058, 0035-0037, 0065, 0061), Sih et al., as modified by DiBuduo, does not specifically teach where the first energy measurer alternatively measures each energy of an early path and a late path. DiBuduo further teaches pilot energy measurements associated with PN phase offsets, whether it corresponds to an early arriving signal or delayed path; (Col. 10, lines 49-67, Col. 11, lines 1-10, Col. 12, lines 54-60, Col. 13, lines 29-43, Col. 6, lines 48-67 & Col. 7, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Sih et al. and DiBuduo in order to enhance the accuracy of a phase measurement process with pilot signals.

Consider Claims 3, 12 and 21, in regards to claims 1, 10 and 19, respectively, above. Sih et al., as modified by DiBuduo, teaches the apparatus wherein the third energy measurer comprises:

-a delay processor for delaying the normalized energy for a predetermined time (0129, lines 4-6, 0034, lines 1-8, 0134, 0081, 0084); and

-a subtractor for calculating a difference between the normalized energy and the delayed energy (0132-0136, 0129), where a calculation module is used.

Consider Claims 4, 13 and 22, in regards to claims 3, 10 and 21, respectively, above. The apparatus of claim 3, further comprising a second normalizer for normalizing the energy difference calculated from the subtractor to a dynamic range (0133-0135, See Parts 1302, 1322 of Figure 13), where a normalizing factor 1320 and a normalized sequence 1322 are used.

Consider Claims 6, 15 and 23, in regards to claims 1, 10 and 19, respectively, above. Sih et al., as modified by DiBuduo, teaches the apparatus wherein the receiving signal is provided from the base station to the mobile terminal as pilot signal on a burst basis (0007, lines 1-9), where pilot signals are transmitted from base station to mobile stations.

Consider Claims 7 and 16, in regards to claims 1 and 10, respectively, above. Sih et al., as modified by DiBuduo, teaches the wherein the second energy measurer comprises:

-a local PN sequence generator for generating the PN sequence having an on-time path's phase (0057-0058, See Parts 302, 208 of Figure 3); and

-a PN despreader for despreading the received signal with the PN sequence having the on-time path's phase (0057-0059, See Parts 304, 208 of Figure 3).

Consider Claims 8 and 17, in regards to claims 7 and 16, respectively, above. Sih et al., as modified by DiBuduo, the apparatus wherein the local PN sequence generator resets the on-time path's phase using the energy difference calculated from the subtractor and generates a PN sequence having the reset on-time path's phase (0057-0058, See Parts 302, 208 of Figure 3, 0132, line 5, 0133-0136).

Consider Claims 9, 18 and 24, in regards to claims 1, 10 and 19, respectively, above. Sih et al., as modified by DiBuduo, the apparatus wherein the first normalizer includes a divider for dividing an energy of the first energy measurer by an energy of the second energy measurer (0133-0134).

Allowable Subject Matter

Claims 5, 14 and 25 are allowed.

The following is an examiner's statement of reasons of allowance: dependent claim 5 establishes a second normalizer that outputs a normalized value in accordance to the equation: y = sqrt(2) * x * exp(- absvalue(x) / sqrt(e)), where x is the energy difference calculated from the subtractor, and y is an output. This limitation is neither disclosed nor suggested in the prior art of record of newly cited references of Sih et al. (US Publication# 2005/0020219) and DiBuduo (US Patent# 6,999,778). Sih et al. teaches a normalizing a delayed energy sequence by utilizing a normalizing factor

module and calculation modules. However, there is no mention of the equation: y = sqrt(2) * x * exp(- absvalue(x) / sqrt(e)), where x is the energy difference calculated from the subtractor, and y is an output. DiBuduo teaches a process of pilot phase measurements for PN phase offsets. This process does not establish or teach using a normalizer for normalized values in accordance to the equation: y = sqrt(2) * x * exp(- absvalue(x) / sqrt(e)), where x is the energy difference calculated from the subtractor, and y is an output. Similarly, dependent claims 14 and 25 include the limitation of a second normalizer that outputs a normalized value in accordance to the equation: y = sqrt(2) * x * exp(- absvalue(x) / sqrt(e)), where x is the energy difference calculated from the subtractor, and y is an output, which none of the prior cited art discloses nor teaches, therefore they are also allowed.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Whitehead et al. (US Patent# 6,744,404) teaches a method of measuring phase of a pseudorandom (PN) sequence of chips that utilizes a data combine and normalize module, with alignments of PN sequences designated as prompt, early and late.

Kim et al. (US Patent 6,944,149) teaches an apparatus for searching for PN sequence phase in a mobile communication system, based on the PN phase and energy information received.

Zhodzicshsky et al. (US Patent# 6,463,091) teaches a receiver having a pseudorandom noise code, and a signal corresponding to the code is generated and used for decoding the received signal when multipath, delayed versions of the signal are present.

Sih et al. (US Publication# 2003/0176203) teaches normalized sequences and factors used for delayed energy sequences in wireless communication devices.

Blakeney, II et al. (US Patent# 5,490,165) teaches a pilot PN sequence generator used in an apparatus for assigning a plurality of demodulation elements, using at least one searcher element and a controller.

Bayley et al. (US Patent# 6,944,143) teaches a method and apparatus for improving searching in a remote unit of a wireless communication system, based on a measured signal strength and the age of the measurement.

Bigo et al. (US Patent# 4,262,360) teaches a device for detecting a pseudo-random sequence of phase changes in a data receiver.

McGraw (US Patent# 6,687,316) teaches a method of measuring phase angle and decoding a pseudorandom noise (PRN) code, where at least two signals are equally distanced advanced or delayed signals, and also using a phase tracking error.

Chen et al. (US Patent# 6,246,717) teaches a system for phase noise measurements on a digitally modulated radio frequency signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Chu whose telephone number is 571-272-7875. The examiner can normally be reached on Monday-Friday (8:30am-5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on 571-272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael Chu
Examiner
Art Unit 2618

MC 06/22/2006

6/26/06

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PRIMARY EXAMINER